



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/029,913      | 12/31/2001  | Ulf Landegren        | LAND DIV            | 5983             |

466 7590 05/21/2003

YOUNG & THOMPSON  
745 SOUTH 23RD STREET 2ND FLOOR  
ARLINGTON, VA 22202

|          |
|----------|
| EXAMINER |
|----------|

CHAKRABARTI, ARUN K

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

1634

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
10/029,913

Applicant(s)  
Landegren

Examiner  
Arun Chakrabarti

Art Unit  
1634



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Apr 15, 2003
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_ 6) ☒ Other: **Detailed Action**

Art Unit: 1634

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 5, 6 and 9-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Nilsson et al (Science, Vol. 265, pages 2085-2088) (30 September, 1994).

With regard to claim 1 in the 102 rejection, a cleavable, detectable function is broadly interpreted to include any removable detectable thing. For example, a nucleotide can be exonuclease treated and detected. Alternately, a biotin label could be chemically removed. Nilsson et al. teaches a method of detecting a target nucleic acid sequence in a sample by contacting the sample with a detectable probe to hybridize the probe to the target sequence, and detecting the hybridized probe, said probe having two free nucleic acid end parts which are at least partially complementary to and capable of hybridizing to two at least substantially neighboring regions of the target sequence (Figure 4), comprising the following steps:

a) hybridizing the probe ends to the target sequence under hybridization conditions (Figure 4);

Art Unit: 1634

b) covalently connecting the ends of the hybridized probe with each other to form a circularizable structure (Figure 4).

c) cleaving the cleavable function (i.e., washing under denaturing conditions in this case) (Figure 4);

characterized in that the probe is provided with a cleavable or dissociable detectable function (Figure 4), and the method comprising the further steps of:

d) separating detectable functions no longer linked to the solid phase (Figure 4);

e) detecting the presence and, if desired, location of the remaining probe as indicative of the presence of the target nucleic acid sequence (Figure 4).

Nilsson et al. teaches that the detectable function is dissociable by being provided either on a further circularizable probe or on a target-specific probe (Figure 4).

Nilsson et al. further teaches the performance covalent connection of the probe ends by enzymatic or chemical ligation (Figure 4).

Nilsson et al. teaches the DNA or RNA as target molecule (Figure 4).

Nilsson et al. teaches the immobilization of oligonucleotide probes as well as the target sequence to a solid phase (Figure 4).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1634

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nilsson et al (Science, Vol. 265, pages 2085-2088) (30 September, 1994) in view of Urdea et al. (U.S. Patent 5,124,246) (23 June, 1992).

Nilsson et al. teach the methods of Claims 1, 5, 6 and 9-13 as described above.

Nilsson et al. do not teach the detectable function is cleavable by cleaving a cleavable linker located on the same probe end as the detectable function.

Urdea et al. teach the detectable function is cleavable by cleaving a cleavable linker located on the same probe end as the detectable function (Figures 3-2 and Column 12, lines 49 to column 13, line 43).

Nilsson et al. do not teach the branched or bifurcated probes.

Urdea et al. teaches a circularizable probe comprising two free cleavable or detectable nucleic acid end parts which are linear, branched or bifurcated and are capable of hybridizing to two at least substantially neighboring regions of a target sequence (abstract, examples 1, 2 and 3).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to substitute the branched or bifurcated probes of Urdea et al. in the method of Nilsson et al. since Urdea et al state, "Suitable cleavable linker molecules may be incorporated into the multimers at predetermined sites for the purpose of analyzing the structure of the multimer or as a means for releasing predetermined segments (such as the portion of the

Art Unit: 1634

multimer that binds to the oligonucleotide) (Column 12, lines 49-55)". Moreover, Urdea et al. states " The multimers may be used in essentially any of the known nucleic acid hybridization formats, such as those in which the analyte is bound directly to a solid phase or sandwich hybridization in which the analyte is bound to an oligonucleotide that is in turn bound to a solid phase (Column 13, lines 56-61)". An ordinary practitioner would have been motivated to combine gap filling ligase chain reaction into the method of Nilsson et al. in order to achieve the express advantages noted by Birkenmeyer et al to improve the sensitivity of nucleic acid based assay by decreasing the occurrence of target independent ligation.

5. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nilsson et al (Science, Vol. 265, pages 2085-2088) (30 September, 1994) in view of Birkenmeyer et al. (U.S. Patent 5,427,930) (27 June, 1995).

Nilsson et al. teach the methods of Claims 1, 5, 6 and 9-13 as described above.

Nilsson et al. do not teach the interspace between probe ends which is filled by an extension reaction prior to covalently interconnecting the probe ends.

Birkenmeyer et al. teaches the interspace between probe ends which is filled by an extension reaction prior to covalently interconnecting the probe ends (abstract and example 1).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to substitute gap filling ligase chain reaction in the method of Nilsson et al. since Birkenmeyer et al. states "It is therefore a primary object of the present invention to improve the sensitivity of nucleic acid based assay by decreasing the occurrence of target

Art Unit: 1634

independent ligation which causes falsely positive background signal. This object is met in the present invention by modifying at least one probe end so that when hybridized with its complementary probe, the resulting duplex is not "blunt-ended" (i.e. ligatable) with respect to the partner complementary probe duplexes. After hybridization to the target, the modified ends are "corrected" in a target dependent fashion to render the adjacent probes ligatable. Several features of the probes and the associated target sequences taught in this application makes this task particularly elegant (column 2, lines 28-42)". An ordinary practitioner would have been motivated to combine gap filling ligase chain reaction into the method of Nilsson et al. in order to achieve the express advantages noted by Birkenmeyer et al to improve the sensitivity of nucleic acid based assay by decreasing the occurrence of target independent ligation.

***Response to Amendment***

6. In response to amendment, 112 (second paragraph) rejections are withdrawn. However, 102(b) and 103 rejections are hereby properly maintained.

***Response to Arguments***

7. Applicant's arguments filed on April 15, 2003 have been fully considered but they are not persuasive.

Applicant argues (page 3, lines 1-5) that Nilsson reference does not teach each and every recitation of the claimed invention, and therefore, 102(b) reference should be withdrawn. This

Art Unit: 1634

argument is not persuasive. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a method capable of detecting, quantifying, and distinguishing between one or several variants with regard to the target sequences in a sample, as mentioned on page 4, lines 19-23) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant also argues (page 4, lines 16-19) that Nilsson reference does not identify a probe that is capable of linking to a solid phase when the target has interacted with the probe. This argument is not persuasive. Nilsson clearly teaches on Figure 4, a probe that is capable of linking to a solid phase when the target has interacted with the probe. This is explicitly taught by Nilsson on the legend of Figure 4, lines 27-30, that bound probes (inherently bound to glass slides) were visualized by means of fluorescein-labeled avidin. Therefore, it is clear that Nilsson anticipates the claimed invention, Therefore, 102(b) rejection is hereby properly maintained.

In response to applicant's arguments (page 5, second paragraph and fourth paragraph to page 6, line 7) against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).



Art Unit: 1634

In response to applicant's argument (page 5, lines 8-12) that Urdea et al. is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Urdea et al reference is reasonably pertinent to the particular problem with which the applicant was concerned, i.e., a method of detecting a target nucleic acid sequence in a sample by hybridization with a probe. Urdea et al only adds another step of amplifying the target nucleic acid, which is clearly permissible by the open "comprising" language of the claims.

In view of the response to arguments, all previous 102(b) and 103 rejections are hereby properly maintained.

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CAR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CAR

Art Unit: 1634

1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arun Chakrabarti, Ph.D. whose telephone number is (703) 306-5818.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion, can be reached on (703) 308-1119. Any inquiry of a general nature or relating to the status of this application should be directed to the Group analyst Chantac Dessau, whose telephone number is (703) 605-1237. Papers related to this application may be submitted to Technology Center 1600 by facsimile transmission via the P.T.O. Fax Center located in Crystal Mall 1. The CM1 Fax Center numbers for Technology Center 1600 are either (703) 305-3014 or (703) 308-4242. Please note that the faxing of such papers must conform with the Notice to Comply published in the Official Gazette, 1096 OG 30 (November 15, 1989).



GARY BENZION, PH.D.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1600

Arun Chakrabarti

Patent Examiner

Art Unit 1634

May 8, 2003